

Since the firehall was unoccupied most of the time, it made sense to lower the temperature a few degrees. The existing thermostat, with a minimum setting of 16 degrees C, was replaced with a 10 degree minimum thermostat. Janzen points out that a five degree celsius drop in temperature reduces energy consumption by 25 per cent. Electric heaters were installed to provide supplementary heat for the second meeting room.

A lot of heat was also escaping through the firehall's two overhead doors and the man door. Although, says Janzen, it would have been ideal to replace all the doors with new airtight, insulated alternatives, the cost was prohibitive. He estimated a 20 year payback. So the next best thing was to caulk and weatherstrip the three doors.

Low-cost Measures Cut Lakefield Firehall's Oil Bill



Two low-cost energy saving measures cut Lakefield Volunteer Firehall's energy bills by \$590.

The near by volunteer Lakefield Firehall, a 184 square meter, 25 year old building, had similar problems. "The thermostat in this building," explains Janzen, "was already set back to the minimum, but the three overhead doors and the man door were riddled with cracks and holes." The doors were weatherstripped and caulked and as an added conservation measure, seven square meters of (unnecessary) window area were covered by insulated panels.

Completed in late 1983, these two simple measures had a significant impact on energy consumption. At a cost of \$655, the project reduced oil consumption by 1,678 litres during the first year, and saved the municipality of Lakefield \$590 in oil bills. The payback was less than two years.



A large window in the Lakefield Volunteer Firehall was covered by insulated panels to cut heating costs.

Electricity Consumption Slashed at Lakefield Community Centre

"The situation was a little different," Janzen continues, "at the Lakefield Smith Community Centre. Operating costs for arenas are obviously much higher than for firehalls, but we still had to look at low cost measures that the municipality could afford."

Constructed in 1974, the 2,220 square meter Lakefield Smith Community Centre comprises a 7-month skating arena, dressing rooms and a banquet hall. "In this case the arena's manager, Neil Pind got the ball rolling," says Janzen. "Concerned about high electricity costs, Pind decided to replace his 28 two-lamp mercury vapour fixtures with 28 single-lamp metal halide luminaires. While the cost of a metal halide fixture (the lamp and ballast) is comparable to the cost of a mercury vapour fixture, it consumes a little more than half as much electricity: 452 watts compared to 865 watts."

Aware of his tight operating budget, Pind installed the lights himself to save on labour costs. "Otherwise," notes Janzen, "the lights would cost twice as much and the municipal budget couldn't handle it." At a cost of \$5,000, the new lamps, installed in August 1985, have a payback of just over three years. Assuming electricity costs of four cents per kWh, the new lights will save \$1,525 annually.

Janzen concludes that the most important factor in improving energy efficiency in small municipalities is people. Once he makes his recommendations, it's the building managers who take the proposals to council and see the projects through. "Enthusiasm and a little effort can produce significant savings at rock bottom costs", he says.



New metal halide lights in the Lakefield Smith arena cut lighting costs by 50%.

Necessary Renovation Reduces Caledon Pool Operating Costs

Graham Burke, Director of Parks and Recreation for the town of Caledon (population 28,500) also knows the challenge posed by tight municipal operating budgets. By 1983, nine years after it was constructed, the Caledon pool was so badly deteriorated, that it had to be either renovated or closed down. Condensation had eroded the metal beams, and caused huge gaps to appear in the building shell. The municipality hired a consultant to assess the damage and suggest corrective measures.

Although the primary task was to repair the building and minimize future condensation damage, the project also presented an opportunity to reduce operating costs by making the building energy efficient. Caledon Municipal Council, however, decided that the entire project was simply too expensive. As an alternative, it was divided into two phases to spread the cost over two years. Most of the essential work, involving the portion of the building that houses the swimming pool, was done first.

Total costs for the first phase amounted to \$44,500.

Phase One Renovation

Phase 1, complete in August 1983, included the following measures:

- all the old, water-saturated insulation was removed from the ceiling and the upper portion of the walls, the steel structure and cladding was sandblasted and repainted with a primer coating, and epoxy and acrylic urethane was applied to all beams and columns.
- polyurethane foam insulation was installed in the ceiling and to the upper eight foot portion of the walls to an R-25 value.
- deteriorated concrete blocks were replaced, rainwater leaders were rerouted.
- structural fasteners were replaced and all cladding was attached to the purlins to improve the strength and integrity of the connections.

- mastic sealing was applied around all roof penetrations and a coating of chlorinated rubber applied to all interior concrete blocks.
- two new exhaust fans with motorized louvers, controlled by the furnace humidistat were installed to reduce humidity in the pool area.
- seven-day set back thermostat for the dressing room and office areas which automatically sets the temperature back to 16 degrees C. at 10 p.m. and returns it to 22 degrees C. at 7 a.m.

Phase One Results

During the first full year of operation after the renovation — September 1983 to September 1984 — natural gas consumption dropped by 68,517 cubic meters for a savings of \$11,330. The real savings actually exceeded the estimated savings by \$2,000 and the payback was 3.4 years rather than the estimated 4.8 years. In addition, the new thermal insulation reduced heat loss by 50 per cent and the exhaust fans reduced humidity levels in the pool area.

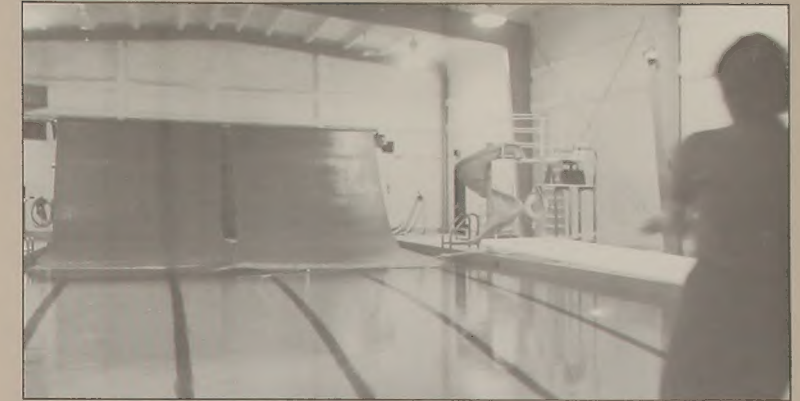
Phase Two

The second phase of the renovation which involved improvements on the side of the building that houses the change rooms, offices and mechanical rooms, was postponed to 1985 because the budget was too limited in 1984. The work was completed in July 1985.

Phase Two Results

Energy savings for the second phase will not match savings from the first phase because the pool area was the major energy consumer. The second phase of the project was divided into structural work and energy saving measures. The primary energy saving measure was replacing saturated insulation from the roof with 3.75 inch polyurethane insulation at a cost of \$10,665. Annual savings of \$1,128 for natural gas are expected.

Pool Cover Adds to Savings



A Caledon Pool staff member applies the new energy-saving pool cover at the end of the day.

Additional measures, identified by John Prins, energy auditor for the region, were implemented in June of 1984. A pool cover was purchased and the humidity control system, installed during Phase 1, was reset and recalibrated for maximum efficiency.

Graham Burke notes that the recalibrated humidistat and the pool cover work together to save energy and reduce humidity levels. The pool cover eliminates evaporation for about 10 hours every day and the humidistat reduces humidity the rest of the time. The pool cover insulates the pool at night, and the dryer air in the pool area cuts out space heating costs because it takes less energy to heat dry air — so the natural gas bill is lower.

Electricity consumption is also cut by shutting down the exhaust fans at night. As a bonus, the building structure is protected from moisture damage.

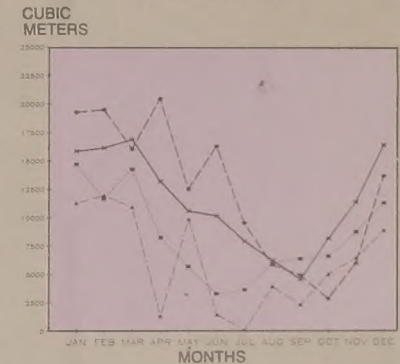
According to Burke, the relatively low \$5,500 price tag for the pool cover, its ability to reduce heat loss, and the condensation protection it provides, made it easy to sell to the Municipal Council.

Although it is difficult to separate the savings due to the first phase renovation work (installed September 1983) and the savings due to the pool cover (installed June 1984), annual energy costs dropped by \$6,816 between the year June 1983-June 1984 and the year June 1984-June 1985. A substantial proportion of those savings was undoubtedly due to the pool cover and control system changes.

The experiences of Dummer and Lakefield townships in the Peterborough area and of Caledon which lies northwest of Toronto, show how much can be done with so little.

Creativity, flexibility and initiative can always find a way around the limitations inherent in small operating budgets. And the extra effort obviously pays off in lower operating costs and often in improved facilities too. In the case of Caledon, particularly, the benefits of incorporating energy efficiency into an essential building retrofit project, go far beyond simply reducing energy costs. A more comfortable building and a sounder building structure will continue to yield benefits for many years to come.

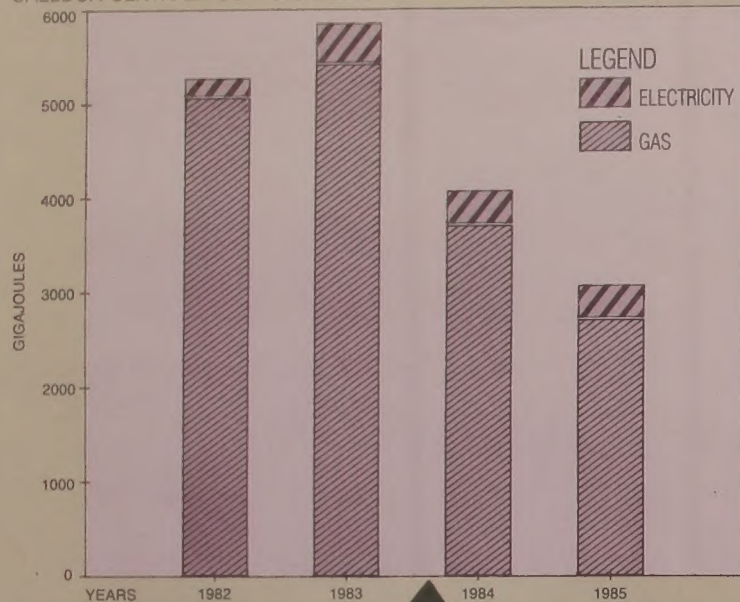
CALEDON CENTRAL POOL GAS CONSUMPTION



LEGEND • 1982 • 1984
• 1983 • 1985

Major building renovations in August 1983, the installation of a pool cover in June 1984, and additional renovation work in July 1985 drastically reduced the Caledon Pool's energy consumption.

CALEDON CENTRAL POOL GAS & ELECTRICITY CONSUMPTION



PROJECT SUMMARIES

Dummer Township Firehall

Municipal Population: 2144
 Original Energy Cost: \$4,449
 Size of Building: 550 square meters
 Cost of Project: \$1,215
 Actual Annual Savings: \$810
 % of Energy Budget Saved: 18 %
 Payback: 1.5 years



Lakeland Firehall

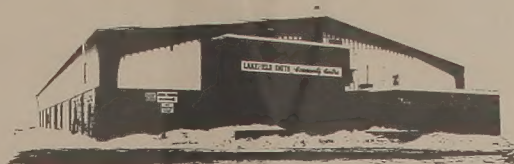
Municipal Population: 2256
 Original Energy Cost: \$1,800
 Size of Building: 184 square meters
 Cost of Project: \$655
 Actual Annual Savings: \$590
 % of Energy Budget Saved: 33 %
 Payback: 1.1 years



Three overhead doors and the main door at the Lakeland Volunteer Firehall were weatherstripped and caulked to reduce energy costs.

Lakeland Smith Community Centre

Municipal Population: 2256
 Original Energy Cost: \$24,250*
 Size of Building: 2,200 square meters
 Cost of Project: \$5,000
 Anticipated Annual Savings: \$1,525
 % of Energy Budget Saved: 6 %*
 Payback: 3.3 years



The Lakeland Smith Community Centre houses a skating rink, dressing rooms and a banquet hall.

Caledon Pool

Municipal Population: 28,500 Size of Building: 542.3 square meters

Phase One Renovation (Completed Sept. 1983)

Original Annual Energy Consumption (Sept. 1982 - Sept. 1983)
 Natural Gas: 164,700 cubic meters
 Electricity: 176,050 kWh

Original Annual Energy Cost (Sept. 1982 - Sept. 1983)
 Natural Gas: \$28,972
 Electricity: \$7,084

Annual Energy Consumption after installation (Sept. 1983 - Sept. 1984)*
 Natural Gas: 96,183 cubic meters*
 Electricity: 102,070 kWh*
 Annual Energy Cost after installation (Sept. 1983 - Sept. 1984)
 Natural Gas: \$17,642
 Electricity: \$5,179

Cost of Project: \$44,500

Annual Energy Cost Savings: \$13,235*

Payback: 3.4 years

*Note that the pool blanket was installed nine months (in June 1984) after the first phase renovation was completed. Lower consumption figures and lower cost figures are therefore affected to some extent by this additional measure. See summary of pool blanket and humidistat recalibration work.

Caledon used a phased approach to retrofit its pool. Council was able to spread the budget for the project over three years.



Pool Blanket Installation and Humidistat Recalibration Installed June 1984

Original Annual Energy Consumption (June 1983 - June 1984)
 Natural Gas: 116,732 cubic meters
 Electricity: 134,150 kWh

Annual Energy Consumption after installation (June 1984 - June 1985)
 Natural Gas: 77,987 cubic meters
 Electricity: 98,353 kWh

Original Annual Energy Cost (June 1983 - June 1984)
 Natural Gas: \$21,279
 Electricity: \$6,464

Annual Energy Cost after installation (June 1984 - June 1985)
 Natural Gas: \$15,474
 Electricity: \$5,353

*Note that a portion of these savings is also due to the first phase renovation which was installed in September 1983.

Cost of Measure: \$5,542

Annual Energy Cost of Savings: \$6,816*

Payback: 0.8 years

Phase Two Renovation

(Installed June 1985)
 Cost of Project (insulation only): \$10,665
 Estimated Annual Savings: \$1,128
 Payback: 9.5 years

For further information contact:

Call (416) 965-6471

Ministry of Energy
 Municipal Conservation Group
 56 Wellesley Street West
 10th Floor
 Toronto, Ontario
 M7A 2B7

© Queen's Printer for Ontario, April 1986

CALEDON
 ES
 - 2023

Energy Conservation in Small Municipalities

3 1761 11890901 9



Heating costs were reduced at the Dummer Township Volunteer Firehall by installing a new thermostat and caulking and weatherstripping the doors.

Municipalities today face a common dilemma. While the operating costs (including energy costs) of many municipal buildings are high, the cost of improving energy efficiency can also be high and municipal budgets are already stretched to the limit. Small municipalities, defined here as municipalities with a population of 50,000 and less, however, are in the most difficult position of all. Don Janzen, Energy Auditor for Peterborough and the surrounding area, explains.

"You don't have the flexibility and the economy of scale. With a larger annual budget, you can always find a little extra by cutting back on some expenditures. And costs can be absorbed more easily. The budgets of small municipalities on the other hand, are just too limited to allow much flexibility," "But," he adds, "you can still take a lot of no-cost low-cost measures to reduce energy costs."

Dummer Township Firehall Energy Success Story

At the Dummer Township Volunteer Firehall, an investment of \$1215 in August 1984, saved the municipality of 2,144 residents \$810 in energy costs the following year. All it took was a new thermostat and weatherstripping and caulking materials, combined with a little elbow grease.

Originally a school house built more than 70 years ago, the 550 square meter, two storey, oil heated firehall was anything but energy efficient. "However," comments Janzen, "we had to keep our costs to a minimum so we looked for measures that would achieve the best results for the lowest cost."



Ministry of Energy

Honourable Vincent G. Kerrio Minister

